US-CL-CURRENT: 264/51,264/55

US-PAT-NO: 4806293
DOCUMENT-IDENTIFIER: US 4806293 A
TITLE: Method of producing a foamed, molded article
DATE-ISSUED: February 21, 1989
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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US-CL-CURRENT: 264/53,264/51 ,264/55
ABSTRACT:
Method of producing a molded article of a foamed thermoplastic resin. A molten mass of an expandable thermoplastic resin is accumulated in an accumulator while it is prevented from foaming. A predetermined quantity of the accumulated thermoplastic resin is ejected rapidly from the accumulator into the atmosphere so that the thermoplastic resin commences foaming. The ejected thermoplastic resin is placed in a mold cavity before the foaming expansion has been completed and is compressed. The expansion and molding of the ejected thermoplastic resin is completed in the mold while controlling the compression pressure to obtain a foamed molded article.
5 Claims, 13 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 4

DEPR:
In the present invention, it is preferred that the molten resin 10 discharged from the accumulator 5 exhibit a low expansion speed. The kind of the melt index (MI) value of the resin, the kind and amount of the blowing agent, the

kind and amount of the expansion aid (cell adjusting agent) and the shape and size of the cross-section of the die 7 of the accumulator 5 through which the resin is discharged have an influence upon the expansion speed. It is especially effective to select a die having such a size and a shape that can provide only a small difference in pressure between the atmosphere into which the molten resin is discharged therethrough and the inside of the accumulator from which the discharge of the molten resin has just been completed. It is also effective to minimize the amount of the expansion aid. For example, in the case of high density polyethylenes having an MI value of 0.5-20, the use of 5-20 parts by weight of dichlorotetrafluoroethane and/or dichlorodifluoromethane, or 0-0.05 part by weight of talc per 100 parts by weight of the polyethylene is recommended.

4762860

US-CL-CURRENT: 521/134,521/136 ,521/139 ,521/143 ,521/146
,521/154 ,521/89
,521/93

US-PAT-NO: 4762860
DOCUMENT-IDENTIFIER: US 4762860 A
TITLE: Alcohol control of lightly crosslinked foamed polymer production
DATE-ISSUED: August 9, 1988
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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US-CL-CURRENT: 521/88,521/134 ,521/136 ,521/139 ,521/143 ,521/146
,521/154
,521/89 ,521/93

ABSTRACT:
An expandable ethylenic or styrenic polymer composition for production of lightly crosslinked foamed polymers and a process for controlling the degree of crosslinking of the polymer prior to extrusion foaming. The control is obtained by use of (a) a reversible gas-yielding crosslinking reaction which is delayed in the foam extrusion line in the presence of gaseous products (alcohols) and (b) added amounts of an alcohol such as an aliphatic alcohol. Suitable crosslinking agents include silanes, azido functional silanes, titanates, and amino compounds.
5 Claims, 0 Drawing figures
Exemplary Claim Number: 1

DEPR:
In this example, the same apparatus as in Example I was used. A high density polyethylene (HDPE) having 0.6 melt index (ASTM D-1238-79 Condition E) and 0.963 g/cc density was used in this example. The polymer granules were mixed with 0.05 pph talc and 0.05 pph organotin catalyst (T-12). The mixture was fed into the extruder at 10 pounds per hour. Extruder zones were maintained at

160.degree., 200.degree. and 200.degree. C. for feeding, melting and
metering, and mixing zone, respectively. The gel temperaure was maintained at
about 130.degree. C. and a 90/10 mixture of FC-12/EtOH was used as the blowing
agent. The test results are presented in Table G.

DETL:
TABLE D

BLOWING AGENT	TYPE	TALC LEVEL	HMMM GAP	DIE PRES.	DIE EXTR. PRES.	FOAM THICK.	TEST NO.	(12)	(1)	(13)	(2)	(3)	(4)	(5)	(6)
1															
FC-12	20.3	0.3	--	0.18	430	1210	1.44	2	FC-12	21.6	0.3	0.2	0.18	600	1720
1.42	3	FC-12/EtOH:80/20	18.8	0.4	--	0.13	380	890	1.23	4	FC-12/EtOH:80/20						
18.8	0.4	0.7	0.13	435	980	1.24	5	FC-114/MeOH:90/10		24.3	0.6	--	0.10	405	
1040	0.89	6	FC-114/MeOH:90/10		24.4	0.6	1.5	0.10	455	1210	0.79				

FOAM	CELL	PREFOAMING	COLLAPSE RESISTANCE			TEST	WIDTH	DENS.
FOAM	SIZE	(?)	95	100	105	110	115.degree. C.	NO.
1								
1.51	1.61	1.01	verge	96	87	31	30	ND
2	1.60	2.18	1.62	melt fract	88	80	26	
13	ND	3	1.45	1.97	1.25	no	100	97
56	40	29	4	1.64	1.89	1.25	no	99
98	85							
71	62	5	1.36	1.61	1.01	no	95	89
17	13	ND	6	1.35	1.76	1.08	no	93
82	49	31						
41								

ND = not determined (1) parts of blowing agent mixed in per hundred parts of
polymer (2) through (11) = the same as in Table B (12) FC12 = dichlorofluoromethane, FC114 = dichlorotetrafluoroethane, EtO = ethanol, MeOH
= methanol (13) parts of talcum powder mixed in per hundred parts of polymer

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US-CL-CURRENT: 264/53,264/DIG.18 ,264/DIG.5 ,521/134 ,521/139 ,521/140 ,521/143 ,521/146 ,521/149 ,521/79 ,521/81 ,521/96 ,525/222 ,525/80 ,525/96 ,525/98

US-PAT-NO: 4847150
DOCUMENT-IDENTIFIER: US 4847150 A
TITLE: Foams of polyolefin/polystyrene resin mixture
DATE-ISSUED: July 11, 1989
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Takeda; Noboru	Suzuki	N/A	N/A	JPX

US-CL-CURRENT: 428/318.8,264/53 ,264/DIG.18 ,264/DIG.5 ,521/134 ,521/139 ,521/140 ,521/143 ,521/146 ,521/149 ,521/79 ,521/81 ,521/96 ,525/222 ,525/80 ,525/96 ,525/98

ABSTRACT:

A foam of a polyolefin/polystyrene resin mixture obtained by mixing a polyolefin resin and a polystyrene resin in the presence of a hydrogenated styrene/butadiene block copolyer, and subjecting the resultant mixed resinous composition to extrusion foaming, wherein;

(1) said hydrogenated styrene/butadiene block copolymer comprises, as components before hydrogenation, 10 to 38% by weight of styrene and butadiene with a content of 1,2-bond type butadiene of 20 to 50% by weight based on butadiene, and;

(2) said foam comprises a thin surface skin portion showing a value of 0.65 or more of the surface structural index S represented by the following formula:

S=t/T.gtoreq.0.65

wherein t and T each represent a total light-transmission evaluated according to the method of ASTM D1003 with respect to a surface skin layer and

an inner layer of the foam,

is found to have the cushioning properties (or the foam properties) that enables elastic cushioning of a large load.

1 Claims, 18 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 10

DEPR:
To a mixture of 52% by weight of high density polyethylene (produced by Asahi Kasei K.K.; B870; M.I.=0.3; density: 0.960 g/cc), 35% by weight of polystyrene (produced by Asahi Kasei K.K.; Stylon 605; M.F.R.=1.5) and 13% by weight of a hydrogenated styrene/butadiene block copolymer A, 0.1% by weight of talc was added as a nucleating. The resultant mixture was dryblended in a Henschel mixer and then thoroughly kneaded in a kneading extruder to obtain a resin mixture as a base material. The base material mixture obtained was continuously fed to an extruder having a bore of 65 mm at the rate of 60 kg/hr to carry out melt kneading, and also, from an inlet for a blowing agent provided at a tip end of the extruder, a blowing agent mixture composed of dichlorotetrafluoroethane and methylene chloride in molar ratio of 7:3 was continuously introduced under pressure and at the rate of 21.7 kg/hr to carry out melt kneading at high temperature and under high pressure. Thereafter, the resultant melt was cooled to 128.degree. C. in a cooling device, and extruded through a die comprising a slit of 2.8 mmt.times.50 mmW, a land of 4 mmL and a taper angle of 30.degree. to a zone of atmospheric pressure to effect expanding. Shear stress (.DELTA.P.times.t/2L) at the land portion was found to be 3.2 kg/cm.sup.2. There was obtained a foam having a density of 20 kg/m.sup.3 and an average cell diameter of 1.0 mm, which was homogeneous and of high commercial value. The index S showing the surface structure was 0.83.

Results obtained by evaluations made in accordance with the methods as
described above are shown in Table 4.

DEPR:
Low density polyethylene (produced by Asahi Kasei K.K.; F-1920; M.I.=2.0;
density: 0.919 g/cc) and 0.4 part by weight of talc as a nucleating agent were
continuously fed to an extruder having a bore of 65 mm to carry out melt
kneading. From an inlet for a blowing agent provided at a tip end of the
extruder, dichlorotetrafluoroethane in amount of 14 parts by weight based on
100 parts by weight of the base material resin was introduced under pressure to
carry out melt kneading at high temperature and under high pressure.
Thereafter, the resultant melt was cooled to 106.degree. C. in a cooling
device, and extruded through a die to a zone of atmospheric pressure to effect
expanding. There was obtained a foam having a density of 50 kg/m.sup.3, an
average cell diameter of 1.0 mm and a closed-cell percentage of 100%.

DEPR:
60% by weight of low density polyethylene (produced by Asahi Kasei K.K.; Q902;
M.I.=0.3; density: 0.920/cc), 40% by weight of polystyrene (produced by Asahi
Kasei K.K.; Stylon 680; M.F.R.=7.5) and 0.1 part by weight of talc as a cell
controlling agent were continuously fed to an extruder having a bore of 65 mm,
followed by carrying out the same operations as in Example 1 to produce a foam.
The foam thus obtained had a density of 25 kg/m.sup.3, an average cell diameter
of 1.0 mm and a closed-cell percentage of 100%. For reference, the index S
showing the surface structure was found to be 0.52.

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